
Research

TRADE AND LABOR MARKET OUTCOMES: EVIDENCE FROM PAKISTAN'S EXPORT ORIENTED AND IMPORT COMPETING INDUSTRIES

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Abstract

Traditional HOS theorem postulates a re-distribution of employment from import competing sector towards export oriented sector with free trade. In order to test this theory for Pakistan, this study investigates the impact of trade on employment and wages of export oriented and import competing industries while using time series data over 1970-71 to 2005-06 and a cross section of 5 export oriented and 13 import competing industries. For estimation purpose, we have used GMM approach. Empirical results show that trade liberalization has a positive impact on employment and wage of both export oriented and import competing industries. The results are robust to different measures of liberalization.

Keywords: Export oriented, import competing, trade, employment, wages

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Introduction

Trade is, by and large, advantageous; and it is in recognition of this fact that countries, companies and individuals trade with each other. Classical theory claims that trade reshuffle resources across sectors according to the principles of comparative advantage. This reshuffling of resources results in an increase in efficiency, lowering price of inputs and final products, and broaden choices of consumers and stimulate growth of national incomes. True, this reshuffling of capital labor resources may result in job losses in some parts of the economy; but it simultaneously opens up new opportunities for investment and jobs in other sectors of the economy. Trade liberalization is therefore, considered as responsible for a creative destruction of jobs, to use Schumpeter's well-known phrase. Heckscher-Ohlin theorem of international trade forms the basis for studying the link between trade and employment. According to the H-O theorem, countries allocate their resources towards the production of a commodity with which the country is abundantly endowed. Developing countries being labor abundant, will allocate their resources towards the production of labor-intensive goods, while developed countries will concentrate on the production of capital intensive goods because they use to have more capital. Trade between them will lead to a more efficient use of resources. It will increase the share of labor in total output in the developing countries and that of capital in the developed countries. The main idea of Heckscher-Ohlin framework is re-distribution of employment from import substituting sector towards export sector.

Pakistan initiated deregulation and liberalization of the economy in the late 1990s as a result of structural adjustment program. In the past, the economy of Pakistan was subjected to different type of trade restrictions in order to protect the economy from foreign competition and to encourage industrialization in the country. The restricted trade regime resulted in inefficiency in the manufacturing sector as a result the economy lagged behind in competitiveness.

Pakistan initiated restructuring the economy by moving towards free trade through gradual reduction in import duties and other non-tariff barriers. The government of Pakistan not only relied on reducing import duties but in most of the cases, non-tariff barriers were replaced with tariffs. Besides, the maximum tariff rate was reduced significantly. In 1986-87, the maximum tariff rate was 225 percent which was reduced to 45 percent during 1997-98 (Khan, 1998). The move towards a more liberalized economy has implication for labor markets in Pakistan.

This study attempts to analyze and empirically test the idea of Heckscher-Ohlin framework which predicts re-distribution of employment from import competing sector towards export oriented sector. We, therefore, investigate the impact of trade on employment and wages of export oriented sector (sector in which Pakistan has comparative advantage) and import competing sector. The previous studies in Pakistan have mainly focused on the impact of trade on overall wages and employment in manufacturing industries. Some studies have investigated the impact on production and non-production workers while others have analyzed the role of labor market regulations and trade on wages and employment.³

None of the studies have investigated the impact of trade on labor demand in sector of comparative advantage in the light of traditional trade theory. This study contributes to the existing body of knowledge by investigating the impact of trade on labor demand of export oriented and import competing industries.

³SEE FOR DETAIL:

1- Javed Iqbal, Misbah Nosheen and Tahirmehmood (2014) Economic Impact of Trade Liberalization: The Case of Pakistan's Manufacturing Industrial Market". *FWU Journal of Social Sciences*, Vol.8, No.2, December 2014.

2- Javed Iqbal, Zafar Mehmood and Misbah Nosheen (2013). How Do Wages and Employment Adjust to Trade Liberalization? A Case Study of Pakistan, *Journal of Business & Economics*, Vol 4. No. 1 2013.

Empirical Evidence

Literature regarding trade and its impact on employment and wages is expanded a great deal over the past two decades. Different approaches and methodologies have been used to address this question, however, the empirical findings are ambiguous and sharply divided. Besides, the methodological issues and country specific conditions tends to affect the trade and labor market outcomes, the empirical evidence on trade, employment and wages is mixed one. The studies which report positive impact of trade on employment include Milner and Wright (1998) for the Mauritian economy; Kambhampati, Krishna, and Mitra (2003) for India; (Grotkowska, 2005) for Poland and Abuka (2005) for South Africa.

Similarly the studies that reported negative impact of trade on employment included the study of Revenga (1992) for the US; and another study by Revenga (1992) for Mexico; Hine and Wright (1998) & Hine and Wright (2000) for the UK manufacturing. There are also some studies which show that trade does not have any significant impact on employment on wages, it includes the study of Hasan (2001) & Banga (2005) for India.

In recent days, some of the studies have investigated the impact of trade on labor demand in manufacturing industries of Pakistan. For example, Iqbal and Nosheen (2008) have investigated the impact of trade on wages and employment in large scale manufacturing of Pakistan. However, their findings are ambiguous. They show positive impact of trade on employment and no impact on wages when they use average tariff rate as a measure of liberalization. However, when openness is used as a measure of trade liberalization, it has negative impact on employment but no impact on wages. In another study, Iqbal et al (2012) incorporate labor market regulations and rigidity. The study shows that if labor markets are flexible, trade liberalization has positive effect both on employment and wages. However, on the other hand, labor market regulations does not have

any significant impact on trade and labor market outcome. A recent study by Iqbal et al (2014) who examine the impact of trade on employment and wages of production and non-production workers, show that trade liberalization has negative impact on employment of both production and non-production workers. The negative impact of trade may be attributed to low mobility of labor because of rigidity of labor markets as well as to the high protection given to most of the inefficient industries in the past.

Empirical Model

To investigate the impact of trade on employment, this study following Milner and Wright (1998) use the following Cobb-Douglas model which in fact is a derived labor demand equation based on profit maximizing behavior of the firm.

$$Y_{it} = A^\gamma K_{it}^\alpha N_{it}^\beta \quad (1)$$

Y, A, K and N are used to represent output, technological progress, capital stock and units of labor respectively. Whereas, γ , α and β denote shares of variables used to represent production efficiency and share of capital and labor respectively, whereas the subscripts 'i' and 't' the it industry and the specific time period respectively. Both vary from $i = 1, 2, \dots, n$ and from $t = 1, 2, \dots, T$. Firm is assumed to reward both capital and labor according to its marginal product, while simultaneously solving the above after eliminating the capital will result in the following model.

$$\left(\frac{\alpha N_{it}}{\times} \times \frac{w_{it}}{\times} \right)^\alpha N_{it}^\beta \quad (2)$$

Taking natural log while Assuming c as constant we get the following expression after taking natural log of eq (2)

$$\ln Y_{it} = \gamma \ln A + \alpha \ln \alpha - \alpha \ln \beta + \alpha \ln W_{it} + (\alpha + \beta) \ln N_{it} \quad (3)$$

$$(\alpha + \beta) \ln N_{it} = -(\gamma \ln A + \alpha \ln \alpha - \alpha \ln \beta) - \alpha \ln W_{it} + \ln Y_{it} \quad (4)$$

$$\ln N_{it} = -(\gamma \ln A + \alpha \ln \alpha - \alpha \ln \beta) / (\alpha + \beta) - \alpha / (\alpha + \beta) \ln W_{it} + 1 / (\alpha + \beta) \ln Y_{it} \quad (5)$$

where

$$\theta_0 = -(\gamma \ln A + \alpha \ln \alpha - \alpha \ln \beta) / (\alpha + \beta), \theta_1 = -\alpha / (\alpha + \beta)$$

$$\text{and} \quad \theta_2 = 1 / (\alpha + \beta)$$

Eq(5) is the derived demand of the industry which can be written as follows:

$$\ln N_{it} = \theta_0 + \theta_1 \ln W_{it} + \theta_2 \ln Y_{it} \quad (6)$$

Just like Greenaway (1995), we also assume A as technical efficiency which is correlated with trade share and evolve over time in the following manner:

$$A_{it} = e^{\delta_0 T_{it}} M_{it}^{\delta_1} X_{it}^{\delta_2}, \quad \delta_0, \delta_1, \delta_2 > 0 \quad (7)$$

Where T is time trend, M and X are imports and exports respectively. To allow for dynamic changes and adjustments in equation (6), the estimated labor demand equation can be written as follows:

$$\ln N_{it} = \theta_0 + \theta_1 \ln N_{it-1} + \theta_2 \ln W_{it} + \theta_3 \ln Y_{it} + \theta_4 \ln V_{it} + u_{it} \quad (8)$$

Where N , W and Y denote total employment, average real wages and industry i output in time t , where $t=1, 2, \dots, T$. V denote vector of variables which affect labor demand it includes variable of liberalization i.e. average tariff rate measured as import duties divided by volume of imports and other variables which affect labor demand such as exports, imports and time trend used as proxy for technology. θ_0 is intercept, while θ_1 , θ_2 , θ_3 and θ_4 are other unknown parameters to be estimated, whereas u_{it} represent error term which can be decomposed further into cross sectional and time effect.

Wage equation can be determined as inverse labor supply function and other factors. To sum up these effects, we estimate a wage equation of the following form:

$$\ln W_{it} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln N_{it} + \beta_3 \ln W_{it-1} + \beta_4 \ln V_{it} + u_{it} \quad (9)$$

where W , Y and N are defined as above, while, β_0 is intercept and β_1 , β_2 , β_3 , β_4 are unknown parameters, to be estimated. In the above model, V represents a vector of variables, affecting labor demand. For the purpose of our study, the key variables are average tariff rate, exports, imports, and time trend used as proxy for technology.

Estimation Procedure

In response to shocks such as trade shock, adjustment of employment and wages is not contemporary rather there is a time lag involved in adjustment; we therefore have to include lag of the dependent variable in the model. However, inclusion of dependent variable with lag has a problem that some of the standard estimators such as OLS, fixed effects, random effects, and feasible generalized least squares (FGLS) tends to produce estimates that are biased and inconsistent. (Nickell 1981 and Kien and Heo 2009). Furthermore, estimation of labor demand and wage equation involve the possibility of endogeneity in the model. To deal with the endogeneity issues, IV and GMM approaches are the most appropriate methods. Nonetheless, we use GMM approach to deal with heteroskedasticity if it is present, whereas even if there is no heteroskedasticity present, GMM estimator is still better compared to IV approach. Unlike IV approach, a GMM estimator makes use of all available moment conditions and therefore, yields not only consistent but efficient estimates also. (Baum, Schaffer, and Stillman 2003).

Data

This study uses a panel data set with a sample of 13 import oriented and 5 export oriented industries manufacturing⁴ while we select data for these industries over a period of 1970-71 to 2005-06. Because of non-availability of time series data on annual basis, this study uses data with a 5 years gap. We use industries data according Pakistan's Standard Industrial Classification (PSIC) at 3-digit level. The data regarding output, employment and wages come from various issues of Census of Manufacturing Industries (CMI) of Pakistan. Commodity-wise exports and imports data come from various issues of Statistical Year Book. To construct variable of trade liberalization, we construct a variable of average tariff by dividing total import duties over volume of imports. We also use exports plus imports over industry valued added as a proxy for trade liberalization. In order to construct variable of real output, this study deflates nominal output with wholesale manufacturing price index. Similarly, we divide employment cost by total number of employees to form nominal wage variable while to convert it into real wages, we deflate nominal wage with consumer price index (CPI).

Results

Estimation results showing the impact of trade liberalization on employment and wages of export oriented industries are presented in Table-1. For estimation purpose, we have used Generalized Method of Moments. It shows that as predicted by theory, trade liberalization has significantly positive impact on employment in export oriented industries. Interestingly, this result is robust to both measures of liberalization; export plus imports over value added as well as average tariff rate. Other variables have expected signs. Such as output has positive impact while real wages have negative impact on employment. Similarly, other trade variables like exports and imports also have positive

⁴List of export oriented and import meting industries is given in the appendix

impact on employment of export oriented industries. Of particular interest is the positive coefficient of imports which unlike expectation has employment creating impact rather employment displacing impact. It can be attribute to the fact, that if imports are in term of raw materials and machinery then it is expected not to displace but to boost up employment.

As far the wage impact of trade liberalization is concerned, interestingly, with both measures of liberalization, wages tend to respond positively to trade liberalization i.e. both openness and average tariff rate has positive impact on real wages of export oriented industries. However, the impact of the latter is insignificant. Other independent variables do carry expected signs.

Our findings indicate that traditional trade theory is applicable well in the case of Pakistan. As according to the traditional trade theory free trade is expected to boost up employment of export oriented sector—the sector in which a country has comparative advantage. In case of Pakistan, being a labor abundant country, export oriented sector mainly consists of labor intensive industries. Hence trade has affected labor favorably in these industries.

Table-2 below indicates the employment and wage effects of trade on import competing industries. The impact of trade on import competing industries is almost similar to the way trade has affected export oriented industries.

International trade has affected employment of import competing industries positively while the findings are robust to both measure of liberalization. In the same manner, real wages too respond positively to free trade. Both openness and average tariff rate tends to have positive impact on wages of import competing industries.

Table-1*Regression results of Export Oriented Industries*

Variables	Employment		Wages	
	X+M/V	Tariff rate	X+M/V	Tariff rate
Intercept	6.978 (4.263)	6.407 (7.783)	0.011 (1.301)	0.045 (5.833)**
Real wages	-3.592 (-3.329)**	-0.534 (-4.178)**		
Employment lag	-2.114 (-2.234)**	1.073 (22.163)**		
Employment			-0.005 (-5.521)**	-0.006 (-5.780)**
Wage lag			0.001 (1.972)**	-0.306 (-2.381)**
Output	0.662 (4.224)**	0.379 (2.012)**	0.004 (4.882)**	0.002 (2.121)**
Liberalization	0.233 (3.279)**	-0.082 (-2.404)**	0.002 (4.532)**	-0.001 (-0.717)
Imports	-	0.165 (5.047)**		0.001 (4.807)**
Exports	-	0.143 (3.358)**		0.001 (1.868)**
Time Trend	0.018 (2.098)**	0.022 (3.164)**	0.003 (3.494)**	0.007 (2.942)**
R-squared	0.579	0.606	0.008391	0.104969
No. of Observation	40	40	40	40
No. of Industries	5	5	5	5
Hansen J-Test :P-value	0.1415	0.1321	0.598374	0.224606
Wald Test (Joint Significance): p-value	0	0	0	0

Note: *Significant at 10% level, ** significant at 5% level a) Robust t-statistics are given in parentheses.
b) Standard errors are HAC heteroskedasticity-and autocorrelation-consistent) or Newey-West standard errors

However, the impact on wages under both measure of liberalization is insignificant.

Other independent variables have expected signs. For example, output have expected signs. Exports have negative but insignificant impact on both employment and real wages. Import penetration has positive impact on both employment and wages of import competing industries. It can be explained by the fact that in order to develop substitutes for imported final good, initially a country has to import some necessary raw materials and inputs that may affect these industries positively. The true impact of imports on import

competing goods can be traced out only if we can classify imports into final goods and other raw materials and intermediate goods. However, this study has a limitation that we do not bifurcate in final imported goods and imported intermediate or raw material goods.

To summarize our findings, the results show that in case of import competing industries, our empirical results do not support the traditional trade theory which expects increasing employment in the exporting sector and re-distribution from import competing sectors towards export oriented sector. In other words our findings support the traditional trade theory partially as employment and wages have gone up in export oriented sector but unlike expectation employment and wages have not reduced in import competing industries.

Table-2
Regression results of Import Oriented Industries

Variables	Employment X+M/V	Tariff rate	Wages X+M/V	Tariff rate
Intercept	6.607 (8.377)**	5.162 (9.916)**	0.157 (5.519)**	0.059 (2.754)**
Real wages	-2.367 (-5.665)**	-3.779 (-3.424)**	-	-
Employment lag	-0.097 (-1.509)**	-2.151 (-1.721)**	-	-
Employment	-	-	-0.027 (-7.637)**	-0.016 (-3.847)**
Wage lag	-	-	-0.001 (-0.787)	-0.047 (-1.700)*
Output	0.609 (11.284)**	0.551 (6.642)**	0.018 (5.676)**	0.011 (3.810)**
Liberalization	0.247 (11.438)**	-0.123 (-3.013)**	0.006 (5.594)	-0.0002 (-0.415)
Imports	-	0.138 (3.781)**	-	0.003 (3.943)**
Exports	-	-0.021 (-0.570)	-	-0.006 (-0.278)
Time Trend	-0.022 (-1.999)**	-0.015 (-0.853)	0.0006 (1.925)*	0.001 (3.228)**
R-squared	0.209533	0.023359	0.273204	0.252203
No. of Observation	104	104	104	104
No. of Industries	13	13	13	13
Hansen J-Test :P-value	0.053259	0.750399	0.244607	0.452929
Wald Test (Joint Significance): p-value	0	0	0	0

Note: *Significant at 10% level, ** significant at 5% level a) Robust t-statistics are given in parentheses.
b) Standard errors are HAC heteroskedasticity-and autocorrelation-consistent) or Newey-West standard errors

Diagnostics tests

To handle the expected endogeneity issue in estimating the simultaneous equations of employment and wages, we have applied GMM approach. However, this approach requires use of some instruments. In our case we have used first difference, lag of the first difference of dependent variable and second lag of the dependent variable as instruments. The validity of instruments we have used needs to be tested. For this purpose, we have used the Hansen J-test. . under null hypothesis that the validity of over-identifying restrictions is supposed to be satisfied if there is no second order correlation of the residuals. Our results of Hansen J- test shows that we are unable to reject our null hypothesis indicating that the instruments we have used are valid and they are exogenous.

Furthermore, we have used a panel dataset that consist of a cross section of industries and time series data. In order to account for the unknown heteroskedasticity and autocorrelation, we have used estimates that are based on HAC (Heteroskedasticity-Auto-correlation Consistent) robust standard errors

Conclusion

This paper has used panel data for 13 import competing and 5 export oriented industries to examine the impact of trade liberalization on employment and wages of export oriented and import competing industries. The study has used two different measures of liberalization; exports plus imports divided by industry value added and average tariff rate. Estimation results show that trade liberalization has positive impact both on employment and wages of export oriented industries. Our empirical results support the traditional HOS theorem which presumes that free trade boosts up labor demand in the export oriented sector. On the other hand, in case of import competing industries, unlike expectations trade has positive impact both on employment and wages of import competing industries. The findings of the results are robust in term of both measures of liberalization: export plus import over industry value added and average tariff rate.

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Appendix-1A:List of Industries

No. of Industries	Import Competing industries	Export Oriented industries
1	Beverages	Food
2	Paper, Printing and Wood products	Tobacco
3	Drugs and medicine industry	Leather & Foot Wear Industry
4	Industrial Chemicals	Textile
5	Other chemicals	Wearing Apparel
6	Coal and Petroleum	
7	Rubber Products	
8	Glass & non-metallic products	
9	Iron bars and Steel Industry	
10	Fabricated metal products	
11	Machinery Industry	
12	Electrical goods	
13	Transport goods	
